

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BOARD OF PATENT APPEALS AND INTERFERENCES

In Re:

Serial No. 10/064,731

Inventor: Francois Charette et al.

Title: METHOD AND APPARATUS FOR OBJECTIVE MEASUREMENT  
OF NOISE

Filed: August 12, 2002

Group Art Unit: 2857

Examiner: Mohamed Charioui

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APPEAL BRIEF PURSUANT TO 37 C.F.R. §41.37

Mail Stop Appeal Brief – Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

Pursuant to the Notification of Non-Complaint Appeal Brief mailed December 5, 2006, Appellants, Francois Charette et al. file this amended Appeal Brief, which is due by January 5, 2007.

**1. Real party in interest.**

The real party in interest of Appellant is Ford Motor Company whose business address is The American Road, Dearborn, Michigan 48121.

**2. Related appeals and interferences.**

There are no other prior and pending appeals, interferences or judicial proceedings, which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision.

**3. Status of claims.**

There are 19 claims pending in this proceeding, numbered 1 to 20. Claims 1, 2, 4-13, and 15-20 stand finally rejected. Claim 14 is objected to. Claim 3 is cancelled.

Applicants identify claims 1, 2, 4-13 and 15-20 as being appealed.

**4. Status of amendments.**

No amendments were filed subsequent to final rejection.

**5. Summary of claimed subject matter.**

The present invention is a method for objectively measuring the level of vibration induced sound occurring in a product or assembly. Vibration occurring during operation of a product or assembly, for example during operation of a motor vehicle, can cause unwanted noise. The unwanted noise, often referred to as a squeak or rattle, typically occurs when particular vehicle components or combinations thereof are subjected to conditions causing vehicle or component vibration. As set forth in claim 1, the present invention objectively measures the

sound level of vibration induced sounds; i.e., squeaks and/or rattles, occurring in a vehicle during use thereof. (¶0017.) After comparing the measured sound levels to a predetermined threshold level feedback information is generated that includes information relating to a comparison of the measured sound level and a predetermined threshold sound level. (¶0020, see also FIG. 2.)

Independent claim 10 in the present invention includes placing a sound recording instrument 16 in a position with respect to the vehicle to record the sound level emitted from the vehicle. (¶0021.) A sound recording instrument 16 is connected to a data acquisition apparatus 20. (¶0019.) A vibration generator 14 vibrates the vehicle 12. While the vehicle is vibrating the data acquisition apparatus 20 records the measured sound data; i.e., the sound or noise level. (¶0019, ¶0021.) The measured sound level is used to compute an objective metric. (¶0021.) The objective metric is compared to a predetermined threshold metric. (¶0021.)

Regarding independent claim 18, the present invention includes placing a sound recording instrument 16 within a vehicle 12. (¶0021.) A data acquisition apparatus 20 connected to the sound recording instrument 16 records sound data, including the measured sound level within the vehicle operator compartment. (¶0021.) The invention includes computing an objective metric based on the measured sound level. (¶0021.) After comparing the objective metric to a threshold metric, the vehicle is subjectively evaluated when the objective metric exceeds the threshold metric and if necessary repairs are made to reduce the sound level to an acceptable level. (¶0035.)

**6. Grounds of rejection to be reviewed on appeal.**

A. Whether claims 1, 4, 5, 10 and 11 are invalid under 35 U.S.C. §103(a) as being unpatentable over Rayment '298 in view of Uhlig '063 and "NVH Reduction Trends."

B. Whether claims 2, 6-8, 12, 13 and 15-20 are invalid under 35 U.S.C. §103(a) as being unpatentable under 35 U.S. C. 103(a) over Rayment (U.S. 5,551,298) in view of Uhlig (U.S. 6,257,063) and "NVH Reduction Trends" and further in view of Hamada et al. (U.S. 2004/0015251).

**7. Argument.**

A. The Examiner's rejection of claims 1, 4, 5, 10, and 11 under 35 U.S.C. §103(a), as being unpatentable over Rayment '298 in view of Uhlig '063 and "NVH Reduction Trends" is not supported by the cited art.

Any decision of obviousness on the part of the Examiner first requires a determination of the scope and content of the prior art. Turning to the prior art cited by the Examiner, United States Patent No. 5,551,298 to Rayment discloses an apparatus for identifying vibration induced noise in a vehicle. The apparatus includes a "data capture means for receiving inputs when a vibration induced noise occurs" and means for comparing the "frequency at which a vibration induced noise occurs with a set of stored data to identify the source of the vibration induced noise." (Col. 1, ll. 54-58.) The apparatus utilizes a vibration generator that vibrates the vehicle over a range of frequencies. (Col. 2, ll. 6-10.) While vibrating the vehicle over a range of frequencies, an operator uses an input/display module 24 to record the vibration frequency at which a vibration-

induced noise begins and ends. The operator moves an indicator line across the screen of an input/display module 24. When a vibration-induced noise is heard, the operator presses a button to fix the position of the indicator line. (Col. 3, ll. 33-37.) Once the first line is fixed, the operator continues to listen to the vibration-induced noise; i.e., rattle or squeak being monitored. When the vibration induced noise ceases, the operator pushes the button again to fix the position of a second line in a similar manner. (Col. 3, ll. 47-51.) The apparatus does not measure the sound level emitted from the product. Instead, the operator subjectively determines the frequency at which the noise starts and stops. (Col. 2, ll. 17-21.) Accordingly, Rayment '298 discloses determining the frequency at which the noise starts and the frequency at which the noise stops thereby establishing two frequency data points that are referred to as low and high measurements. (Col. 3, ll. 44-51.)

Rayment '298 fails to disclose establishing a threshold metric based on a sound level. Instead, Rayment '298 obtains data based on the frequency at which the sound or noise appears and disappears, not the level thereof. Specifically, the frequency data, including the mean frequency and frequency range, is obtained from the high-low frequency measurements. (Col. 3, ll. 57-67 and Col. 4, ll. 15-18.)

The Examiner maintains that Rayment '298 teaches "measuring the vibration induced noise emitted from the product..." (Office Action Summary mailed March 27, 2006, pp. 2.) Contrary to the Examiner's contention, the portion of the specification of Rayment '298 cited by the Examiner teaches how

to obtain two frequency data points, specifically line A and line B, which are referred to as a low-high measurement. Rayment '298 states, "Each individual low-high measurement has a Mean Frequency and a Frequency Range with the mean being the average frequency of the low and high frequencies, and the range being the difference of these frequencies." (Col. 3, ll. 62-66.)

In addition, the Examiner relies on the entire Summary of the Invention as support for the statement that Rayment '298 teaches "establishing a threshold metric generating an objective metric based on the measured the vibration induced noise includes the steps of acquiring the vibration induced noise data for a defined time period,...." (Office Action Summary mailed March 27, 2006, pp. 2.) Contrary to the Examiner's contention, nothing in the Summary of the Invention indicates measuring vibration induced noise. As set forth in the summary, Rayment '298 identifies the frequency at which a vibration induced noise appears and the frequency at which it disappears. (Col. 2, ll. 45-47.)

Uhlig, United States Patent No. 6,257,063, discloses a method for measuring vibration damping, specifically the vibration damping capability of a part. (Col. 3, ll. 13-15.) An exciter coil 46 electromagnetically induces vibrations in the part such that the part vibrates at its resonant frequency. (Col. 3, ll. 46-54.) The level or amplitude of vibration induced in the part is measured with a transducer such as a microphone 54. (Col. 3, ll. 55-57.) The microphone 54 measures the sound or vibration level and provides a measure of the sound level to a measuring amplifier 64. When the measuring amplifier 64 indicates the peak or resonant frequency has been received and transmitted by the microphone 54

the frequency readout of the waveform generator 56 is noted. (Col. 4, ll. 4-15.) Uhlig '063 discloses that the resonant frequency is needed to determine the vibration damping capability of the part or product. (Col. 1, ll. 54-57, Col. 5, ll. 6-9.) After determining the peak or resonant frequency, the gain of the audio power amplifier 60 of the microphone 54 is adjusted to produce a predetermined measured output voltage. (Col. 4, ll. 19-23.) At this point, a switch 58 interrupts the output of the waveform generator 56 and deactivates the exciter coil 46 thereby eliminating the input of vibrational energy into the part and causing the vibrations in the part to decay. The decay is recorded and graphed by a real-time analyzer 68. (Col. 4, ll. 27-33.) The real-time analyzer 68 plots the decay of the sound level produced by the part as a function of time. (Col. 4, ll. 35-40.) Accordingly, Uhlig '063 measures the decrease in amplitude of the decaying vibrational wave of the part once the exciter coil 46 is switched off. That is, Uhlig '063 discloses measuring the decay rate of the sound level after a peak is reached. The decay is recorded and graphed on a decibel versus time plot. (Col. 4, ll. 32-33.) The disclosure states that the measured values of interest are the frequency of the waveform generator at triggering; i.e., when the waveform generator produces peak output amplitude, and the slope of the sound level decay curve. (Col. 4, ll. 34-37.)

Accordingly, Uhlig '063 is concerned with the slope of the decaying curve (Col. 4, ll. 36-38,) not the peak value which is adjusted to produce a predetermined measured output voltage from the microphone 54. (Co. 4, ll. 21-24.) As the disclosure states, "any portion of the decay curve may be chosen for

slope measurement purposes, ....” (Col. 4, ll. 45-48.) These two values are used to determine vibration damping performance referred to as the Q-factor. (Col. 1, ll. 47-50; Col. 5, ll. 6-10.) Thus, Uhlig ‘063 does not measure the sound level emitted from the product, instead Uhlig ‘063 uses a waveform generator to input vibrational energy into a component to excite the component to a resonant frequency and then measures of the rate of decay of the sound level once the vibrational energy input is eliminated.

“NVH Reduction Trends” states that statistical measurements are used to describe a set of noise measurements as a single value and that these measurements can be used in association with measuring the loudness levels of squeak and rattle events.

A(1). The Examiner's rejection of Claim 1 as being unpatentable under 35 U.S.C. §103(a), over Rayment ‘298 in view of Uhlig ‘063 and “NVH Reduction Trends” is not supported by the cited art.

In order to reject the claims of an application under 35 U.S.C. §103(a) an Examiner must show an unrebutted prima facie case of obviousness. *In re Kahn*, 441 F.3d 977, 985 (Fed Cir. 2006.) “[M]ere identification in the prior art of each element is insufficient to defeat the patentability of the combined subject matter as a whole.” *In re Kahn*, 441 F.3d at 986. Accordingly, the Examiner must set forth reasons why “one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious. (Citations omitted.)” *In re Kahn*, 441 F.3d at 986.

Claim 1 requires the steps of measuring the sound level emitted from the product, establishing a threshold metric based on a sound level and generating



an objective metric based on the measured sound level. Wherein the step of generating an objective metric based on the measured sound level includes the steps of acquiring sound data for a defined time period and computing an objective metric based on an N10 loudness scale from the acquired sound data. In addition, claim 1 includes the step of comparing the objective metric with the threshold metric. The Examiner has failed to articulate where in the cited references the motivation teaching or suggestion of the proposed combination is found. Initially, Applicant points out that Uhlig '063 is not concerned with objectively monitoring a noise level occurring in a product, but instead deals with determining the vibration damping capabilities of a part. As such, applicants submit that Uhlig '063 is non-analogous art and is therefore not relevant prior art.

Even though Uhlig '063 is not relevant prior art, the Examiner maintains that it would have been obvious "to incorporate Uhlig's teaching into Rayment's invention because the modification would determine whether the sound level emitted from the product is within the acceptable range or not..." (Office Action Summary mailed March 27, 2006, pp. 2-3.) The Examiner offers no support for this statement. Further, the Examiner fails to identify what portion of Uhlig's teaching would be incorporated into Rayment '298, and does not point to any portion of Uhlig '063 that teaches or suggests the combination as proposed by the Examiner. A bare statement that Uhlig '063 measures the sound level and thus it would have been obvious to incorporate this into Rayment 298 is not enough. Absent an explanation of the motivation, suggestion or teaching set forth in the cited references, the only conclusion is that the Examiner

impermissibly used hindsight in an attempt to piece together the invention from the prior art.

In addition, the Examiner does not explain the motivation, suggestion or teaching set forth in "NVH Reduction Trends" that would lead a person of ordinary skill in the art to combine it with Rayment '298 and Uhlig '063. As set forth above, "NVH Reduction Trends" deals with sound measurements on a N10 loudness scale. Rayment '298 uses the vibration frequency at which a sound occurs to determine or identify a vibration induced noise occurring in a vehicle. Rayment '298 is not concerned with the loudness of the noise, simply when it starts and stops. Uhlig '063 is concerned with the rate of decay of the sound level after the vibrational energy input is eliminated. Once again, rather than offering an explanation of the motivation, suggestion or teaching in the cited references that would lead a person of ordinary skill in the art to combine the cited references, the Examiner has used hindsight to piece together applicants claimed invention. Accordingly, claim 1 is allowable as written.

A(2). The Examiner's rejection of claim 4 as being unpatentable under 35 U.S.C. §103(a), over Rayment '298 in view of Uhlig '063 and "NVH Reduction Trends" is not supported by the cited art.

As set forth above, the Examiner has failed to identify any teaching, suggestion or motivation in the cited prior art that would lead a person of ordinary skill in the art to the combine the references as proposed by the Examiner to make the claimed invention. Claim 4, which depends from claim 1 sets forth additional limitations including: selecting a product that meets allowable noise level standards, measuring the sound level of said selected product and using

the measured sound level of the selected product to compute a threshold metric based on a N10 loudness scale. Instead of pointing to specifics regarding the teachings of the cited references, the Examiner makes general statements of what these references teach. For example, the Examiner maintains that Rayment '298 discloses establishing a threshold metric and then argues that it would have been obvious "to incorporate NVH Reduction Trends"'s teaching into Rayment's invention, because it would provide sound data measurements N10 loudness scale. Therefore, changes in peaks of the vibration sound levels would be indicated and performance of the product would be evaluated." (Office Action Summary mailed March 27, 2006, pp. 3.) Nowhere does Rayment '298 disclose use of changes in peaks of the vibration sound levels to indicate performance of the product. Rayment '298 is concerned with the vibration frequencies at which the sound occurs not the loudness thereof. Once again, the Examiner fails to address where the specific elements of claim 4 are taught or suggested in the prior art and does not explain the motivation to combine these teachings or suggestions with the disclosure Rayment '298. Accordingly, claim 4 is allowable as written.

A(3). The Examiner's rejection of claim 10 as being unpatentable under 35 U.S.C. §103(a), over Rayment '298 in view of Uhlig '063 and "NVH Reduction Trends" is not supported by the cited art.

The Examiner has failed to point out the teachings or suggestions in the prior art or explain the motivation for combining the prior art as proposed by the Examiner to reject applicant's claim. Claim 10 includes the elements of measuring the level of the vibration induced sound, computing an objective

metric and comparing the objective metric with a threshold metric. As set forth above, these elements are not taught or suggested by the prior art. Rayment '298 does not measure the level of the vibration induced sound, but simply when the sound starts and stops. Uhlig '063 is concerned with obtaining the resonant frequency and the slope of the decaying vibrational wave to determine the damping capability of a product. In contrast to the Examiner's proposed combination, Uhlig '063 teaches that the product should be excited to a single frequency; i.e., the resonant frequency. Rayment '298, teaches that the product should be excited through a broad range of frequencies and emitted noise should be monitored to determine when the noise starts and stops. Accordingly, incorporating the teachings of Uhlig '063 with Rayment '298 defeats the purposes or teachings of Rayment '298. Accordingly, nothing in the references points to the combination proposed by the Examiner and thus claim 10 is allowable as written.

- A(4). The Examiner's rejection of claim 11 as being unpatentable under 35 U.S.C. §103(a) over Rayment '298 in view of Uhlig '063 and "NVH Reduction Trends" is not supported by the cited art.

The Examiner has failed to point out the teachings or suggestions in the prior art or explain the motivation for combining the prior art as proposed by the Examiner to reject the applicants' claim. Claim 11 includes as an element thereof that the objective metric and the threshold metric are based on a N10 loudness scale. The Examiner makes a generalized statement that it would have been obvious to incorporate the teachings of "NVH Reduction Trends" into Rayment's invention "because it would provide sound data measurements N10

loudness scale." (Office Action Summary mailed March 27, 2006, pp. 3.) The Examiner offers no teaching or suggestion from any of the cited references disclosing the elements of applicant's claim, nor does the Examiner provide any motivation for combining the references as proposed by the Examiner.

"NVH Reduction Trends" deals with audible sounds and loudness levels. As set forth previously, Rayment '298 is concerned with the vibration frequency at which the sound starts and stops. Accordingly, the Examiner's statement that "changes in peaks of the vibration sound levels would be indicated and performance of the product would be evaluated" is incorrect. Rayment '298 does not address changes in peaks of the vibration sound levels; to the contrary, Rayment '298 simply addresses the presence or absence of sound. As set forth in claim 11, both the objective metric and threshold metric are based on a N10 loudness scale. Rayment '298 uses the frequencies at which the noises start and stop to determine or identify the source of the noise, not the sound levels as set forth and claimed by applicants. Accordingly, since these elements are not taught or suggested by the prior art, claim 11 is allowable as written.

A(5). The Examiner's rejection of claim 5 as being unpatentable under 35 U.S.C. §103(a) over Rayment '298 in view of Uhlig '063 and "NVH Reduction Trends" is not supported by the cited art.

Contrary to the Examiner's statement, Rayment does not teach, "performing statistical processing based on the saved information; and preparing reports based on the saved information." (Office Action Summary mailed March 27, 2006, pp. 3.) The portion of the specification relied on by the Examiner for this statement, in particular Col. 1, ll. 59-67, merely states that it is possible to

build up a set of stored data against which the frequency at which the noise occurs is compared and that comparison generates a most likely concern for the measured noise. (Col. 4, ll. 15-18 and ll. 25-34.) Rayment '298 does not teach saving the information related to the objective metric and threshold metric and performing statistical processing based on the same information. Rayment '298 merely monitors the frequency at which the noise starts and stops and compares the information to a database containing noises that occur at certain frequencies along with potential sources of the noise. Accordingly, since there is no teaching, suggestion or motivation to combine the cited references as proposed by the Examiner, claim 5 is allowable as written.

B. The Examiner's rejection of claims 2,6-8, 12,13 and 15-20 as being unpatentable under 35 U.S. C. 103(a) over Rayment (U.S. 5,551,298) in view of Uhlig (U.S. 6,257,063) and "NVH Reduction Trends" and further in view of Hamada et al. (U.S. 2004/0015251) is not supported by the cited art.

Hamada et al. (U.S. 2004/0015251) discloses a sound evaluation system using a sound recording device 2. (¶0025.) A computer 21 including an analog to digital converter converts the sound picked up a by the microphone to a digital signal and then stores the digital signal. (¶0026.) The stored signal is then compared to reference data, including digital sound signals stored in a database. (¶0028.) The reference data is obtained by sampling both normal operating sounds of vehicle components and abnormal operating sounds of vehicle components. (¶0029.) The conclusion of the evaluation; i.e., comparison of the digital sound data, also includes providing an output that may include information on providing a repairing method. (¶0029.)

B(1). The Examiner's rejection of Claim 2 as being unpatentable under 35 U.S. C. 103(a) over Rayment (U.S. 5,551,298) in view of Uhlig (U.S. 6,257,063) and "NVH Reduction Trends" and further in view of Hamada et al. (U.S. 2004/0015251) is not supported by the cited art.

Claim 2 includes the steps of determining when the objective metric exceeds the threshold metric and when the objective metric exceeds the threshold metric subjectively evaluating the noise emitted from the product to diagnose the reason for the objective metric exceeding the threshold metric. In addition, the claim also requires performing any repairs necessary to the product such that the noise level of the product meets acceptable noise level standards. Initially, as set forth above, nothing in the combination of Rayment '298, Uhlig '063 and "NVH Reduction Trends" teaches the use of determining when the objective metric exceeds the threshold metric and subjectively evaluating the noise emitted from the product when the objective metric exceeds the threshold metric. Adding Hamada 2004/0015251 as a reference does not change this. Hamada does not teach or suggest these limitations; Hamada is concerned with comparing digital sound signals. Combining Hamada with Rayment '298 does not teach applicants' invention, nor would a person of ordinary skill in the art be motivated to make such a combination since Hamada is concerned with digital sound signals and Rayment '298 is concerned with the vibration frequencies at which sounds occur.

The Examiner maintains that "[i]t would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate Hamada et al's teaching into Rayment in view of "NVH Reduction Trends"'s teaching,

because it would repair the product defect.” (Office Action Summary mailed March 27, 2006, pp. 4.) Irrespective of Hamada, Rayment ‘298 already states that his device enables “quick and accurate determination of the source of the rattle or squeak” and states, “necessary remedial action ... can then be taken to prevent the rattle or squeak reappearing.” (Col. 4, ll. 49-55.) Applicant submits that Rayment ‘298 discloses one method for identifying the source of vibration induced noises occurring on vehicles. Rayment ‘298, either by itself or combined with the prior art cited by the Examiner, does not teach or suggest applicants claimed invention. Once again, the Examiner is simply selecting the elements of applicants’ claim 2 from the prior art and piecing them together with hindsight to arrive at claim 2. Since the Examiner has failed to identify any teaching, suggestion or motivation to combine the prior art as proposed by the Examiner, claim 2 is allowable as written.

B(2). The Examiner’s rejection of Claim 6 as being unpatentable under 35 U.S.C. 103(a) over Rayment (U.S. 5,551,298) in view of Uhlig (U.S. 6,257,063) and “NVH Reduction Trends” and further in view of Hamada et al. (U.S. 2004/0015251) is not supported by the cited art.

Claim 6 includes as an element thereof the step of preparing at least one report as part of the step of generating feedback. First, the Examiner has not identified any disclosure in any of the cited prior art references directed to the elements of this claim. Second, the Examiner has provided no support, including the requisite teaching, suggestion or motivation to combine the cited references to yield the claimed invention. Since the prior art does not disclose these elements, claim 6 is allowable as written.



- B(3). The Examiner's rejection of Claim 7 as being unpatentable under 35 U.S. C. 103(a) over Rayment (U.S. 5,551,298) in view of Uhlig (U.S. 6,257,063) and "NVH Reduction Trends" and further in view of Hamada et al. (U.S. 2004/0015251) is not supported by the cited art.

Claim 7 includes the steps of documenting any diagnosis and repair relating to the product, determining the most common cause of noise in the product and providing possible suggestions to improve the product by reducing overall noise levels. The Examiner has indiscriminately grouped claim 7, along with other claims, in a general rejection and has not identified any disclosure in any of the cited prior art references directed to the elements of claim 7. Additionally, the Examiner has provided no support, including the requisite teaching, suggestion or motivation to combine the cited references to yield the claimed invention. Since the prior art does not disclose these elements, claim 7 is allowable as written.

- B(4). The Examiner's rejection of claims 8 as being unpatentable under 35 U.S. C. 103(a) over Rayment (U.S. 5,551,298) in view of Uhlig (U.S. 6,257,063) and "NVH Reduction Trends" and further in view of Hamada et al. (U.S. 2004/0015251) is not supported by the cited art.

Claim 8 includes the step of documenting, using a standardized list of descriptors, the cause of the noise and any necessary repairs to the product. Again, the Examiner has applied a general rejection to claim 8 and has not identified any disclosure in any of the cited prior art references directed to the elements of these claims. The Examiner has provided no support, including the requisite teaching, suggestion or motivation to combine the cited references as

proposed by the Examiner. Since the prior art does not disclose these elements, claim 8 is allowable as written.

B(5). The Examiner's rejection of Claim 12 as being unpatentable under 35 U.S.C. 103(a) over Rayment (U.S. 5,551,298) in view of Uhlig (U.S. 6,257,063) and "NVH Reduction Trends" and further in view of Hamada et al. (U.S. 2004/0015251) is not supported by the cited art.

Claim 12 includes the steps of evaluating the comparison of the objective metric with the threshold metric to determine whether the vibration induced sound level in the vehicle is unacceptable, when the evaluation indicates that the sound level is unacceptable diagnosing the vehicle to determine the source of the unacceptable sound level and performing an appropriate repair. Nothing in the combination of Rayment '298, Uhlig '063 and "NVH Reduction Trends" discloses evaluating the comparison of the objective metric with the threshold metric to determine whether the vibration induced sound level in the vehicle is unacceptable and when the evaluation indicates that the sound level is unacceptable, diagnosing the vehicle to determine the source of the unacceptable sound level and performing an appropriate repair after which confirming that the unacceptable sound level is no longer present. Adding Hamada 2004/0015251 as a reference does not change this. As set forth above, Hamada discloses digitizing a sound signal and comparing it to a reference database of stored digital sound signals. Hamada discloses that after the comparison, the output includes information regarding a repairing method. Again, the Examiner does not point to or identify any specific disclosure contained in any of the cited references disclosing the elements of claim 1. Nor,

does the Examiner set forth or identify any teaching, suggestion or motivation that would lead a person of ordinary skill in the art to combine the references as proposed by the Examiner. The Examiner tries to combine non-analogous art to support the rejection despite the explicit disclosure of each prior art reference; specifically, Rayment '298 is concerned with vibration frequencies and Hamada with digital sound signals. Since the prior art does not disclose the elements of claim 12, nor does it teach, suggest or provide motivation for the combination as proposed by the Examiner, claim 12 is allowable as written.

B(6). The Examiner's rejection of Claims 13 and 15 as being unpatentable under 35 U.S.C. 103(a) over Rayment (U.S. 5,551,298) in view of Uhlig (U.S. 6,257,063) and "NVH Reduction Trends" and further in view of Hamada et al. (U.S. 2004/0015251) is not supported by the cited art.

Claim 13 includes the step of documenting any diagnosis and repair. Claim 15 depends from Claim 13 and includes the step of inputting into the data acquisition apparatus information pertaining to the diagnosis and repair. As with previous claims, the Examiner has applied a general rejection to claims 13 and 15 and has not identified any disclosure in any of the cited prior art references directed to the elements of these claims. Additionally, the Examiner has provided no support, including the requisite teaching, suggestion or motivation to combine the cited references as proposed by the Examiner. Since the prior art does not disclose the claimed elements and the Examiner has failed to provide support for the proposed combination, claims 13 and 15 are allowable as written.

- B(7). The Examiner's rejection of Claim 16 as being unpatentable under 35 U.S. C. 103(a) over Rayment (U.S. 5,551,298) in view of Uhlig (U.S. 6,257,063) and "NVH Reduction Trends" and further in view of Hamada et al. (U.S. 2004/0015251) is not supported by the cited art.

Claim 16 includes the steps of saving data relating to each vehicle tested including, the objective metric, threshold metric and any diagnosis and repair along with performing a statistical analysis on the saved data. The Examiner maintains that Rayment '298 teaches these elements. (Office Action Summary mailed March 27, 2006, pp. 4.) Specifically, The Examiner relies on Col. 1, ll. 45-67 of Rayment '298. Nothing in the cited portion of Rayment '298 teaches, suggests or discloses saving data relating to each vehicle tested. Rayment '298 merely indicates that it is possible to build up a set of stored data that indicates, for example, a noise occurring at a particular frequency is likely to result from a particular source. Since Rayment '298 does not disclose the elements of claim 16 and the Examiner has failed to provide support for the proposed combination, claim 16 is allowable as written.

- B(8). The Examiner's rejection of claim 17 as being unpatentable under 35 U.S. C. 103(a) over Rayment (U.S. 5,551,298) in view of Uhlig (U.S. 6,257,063) and "NVH Reduction Trends" and further in view of Hamada et al. (U.S. 2004/0015251) is not supported by the cited art.

Claim 17 includes the steps of saving data relating to each vehicle tested including the objective metric, threshold metric and any diagnosis and repair. Claim 17 also includes elements relating to performing statistical processing on the saved data, generating feedback based on the statistical processing, reviewing the feedback to determine repair information and using the feedback to

develop corrective action to reduce the level of vibration induced sound. Again, the cited portion of Rayment '298, specifically Col. 1, ll. 45-67, does not disclose the elements set forth in claim 17. Thus, claim 17 as written is allowable.

B(9). The Examiner's rejection of Claim 18 as being unpatentable under 35 U.S. C. 103(a) over Rayment (U.S. 5,551,298) in view of Uhlig (U.S. 6,257,063) and "NVH Reduction Trends" and further in view of Hamada et al. (U.S. 2004/0015251) is not supported by the cited art.

Claim 18 includes a plurality of steps including measuring and recording the sound level emitted from the vehicle during operation, computing an objective metric based on the recorded sound level, subjectively evaluating the vehicle to determine the source of the sound emitted from the vehicle when the objective metric exceeds a threshold metric and repairing the vehicle to reduce the sound to an acceptable level. Contrary to the Examiner's rejection, Rayment '298, Uhlig '063, "NVH Reduction Trends" and Hamada do not disclose measuring and recording the sound level emitted from the vehicle during operation and computing an objective metric based on the recorded sound level after which the vehicle is evaluated to determine the source of the sound when the objective metric exceeds a threshold metric.

As set forth previously, Rayment '298 is concerned with vibration frequency, Uhlig '063 is concerned with determining the resonant frequency and slope of the decaying vibrational wave, "NVH Reduction Trends" discloses using statistical measures N10 and N50 to describe a set of noise measurements as a single value and Hamada is concerned with comparing digital sound signals. There is no teaching, suggestion or motivation to combine Uhlig '063 into

Rayment's invention, nor does the Examiner point out with any specificity the teaching, suggestion or motivation that would lead a person of ordinary skill in the art to make such a combination. Each of the prior art references monitors a different parameter. Accordingly, absent the requisite teaching, suggestion or motivation the Examiner's rejection of claim 18 is unsupported and claim 18 is allowable as written.

B(10). Examiner's rejection of claim 19 as being unpatentable under 35 U.S. C. 103(a) over Rayment (U.S. 5,551,298) in view of Uhlig (U.S. 6,257,063) and "NVH Reduction Trends" and further in view of Hamada et al. (U.S. 2004/0015251) is not supported by the cited art.

Claim 19 includes as an element that the objective metric and a threshold metric are based on a N10 loudness scale. Again, the Examiner makes a general rejection to claim 19. The Examiner maintains that "NVH Reduction Trends" would provide sound data measurements N10 loudness scale. Yet, the Examiner offers no teaching, suggestion or motivation as to why the disclosure of "NVH Reduction Trends" should be combined with Rayment '298. Rayment '298 addresses or is concerned with vibration frequencies at which sound or noise starts and stops. Rayment '298 is not concerned with any type of loudness scale. Absent the requisite teaching, suggestion or motivation to combine the references, the Examiner's rejection becomes a hindsight piecing together of the claimed invention, a prohibited course of action. Since the elements of claim 19 are not disclosed in the prior art, nor has the Examiner identified any teaching, suggestion or motivation to combine the prior art in the manner proposed by the Examiner claim 19 is allowable as written.

B(11). The Examiner's rejection of claim 20 as being unpatentable under 35 U.S. C. 103(a) over Rayment (U.S. 5,551,298) in view of Uhlig (U.S. 6,257,063) and "NVH Reduction Trends" and further in view of Hamada et al. (U.S. 2004/0015251) is not supported by the cited art.

Claim 20 includes a plurality of steps including documenting the evaluation and repair, saving data related to each vehicle tested including the recorded sound level, the objective metric, threshold metric, the evaluation and any repair, performing statistical processing on the saved data, generating feedback information based on the statistical processing, and using the feedback to develop corrective action to reduce the sound level in the vehicle. Again, the Examiner relies on Rayment '298 maintaining that it teaches, suggests or discloses saving data relating to each vehicle tested. To the contrary, Rayment '298 merely indicates that it is possible to build up a database that indicates a noise occurring at a particular frequency is likely to result from a particular source. Further, claim 20 requires statistical processing on the data. The disclosure of Rayment '298 referred to by the Examiner in rejecting the claim does not disclose this element. The Examiner cites to a portion of the disclosure of Rayment '298 and makes a general statement that this teaches applicants claimed invention. A general statement is not sufficient. Since the cited references do not disclose, nor do they teach, suggest or provide motivation for the combination of references as claimed, claim 20 is allowable as written.

C(1). The Examiner has offered no support for the rejection of claim 9.

The Office Action Summary indicates that claim 9 is rejected. The Examiner, however, offers no support for this rejection. The only reference to claim 9 made by the Examiner was in the Office communication mailed August 18, 2004 wherein the Examiner objected to the claim as having insufficient antecedent basis. Applicant amended claim 8 to cure the antecedent basis objection, the amendment was straightforward and no further explanation was deemed necessary. The Examiner has offered no other basis for rejecting claim 9. Accordingly, applicants submit that claim 9 is in condition for allowance.



## **8. Claims appendix**

### **LISTING OF THE CLAIMS**

1. (Rejected): A method for objectively monitoring a noise level occurring in a product during use comprising the steps of:

    imparting energy to the product to simulate an in use condition of the product;

    measuring the sound level emitted from the product;

    establishing a threshold metric based on a sound level;

    generating an objective metric based on the measured sound level includes the steps of acquiring sound data for a defined time period, and computing an objective metric based on an N10 loudness scale from the acquired sound data;

    comparing the objective metric with the threshold metric; and

    generating feedback, the feedback including information relating to the comparison of the objective metric and the threshold metric.

2. (Rejected): A method for objectively monitoring a noise level as set forth in claim 1 including the steps of:

    determining when the objective metric exceeds threshold metric;

    when the objective metric exceeds the threshold metric subjectively evaluating the noise emitted from the product to diagnose the reason for the objective metric exceeding the threshold metric; and

performing any repairs necessary to the product such that the noise level of the product meets acceptable noise level standards.

3. (Cancelled).

4. (Rejected): A method for objectively monitoring a noise level as set forth in claim 1 wherein the step of establishing a threshold metric includes the steps of:

selecting a product that meets allowable noise level standards and measuring the sound level of said selected product; and

using the measured sound level of the selected product to compute a threshold metric based on an N10 loudness scale.

5. (Rejected): A method for objectively monitoring a noise level as set forth in claim 1 including the steps of:

saving information related to the objective metric and the threshold metric;

performing statistical processing based on the saved information; and

preparing reports based on the saved information.

6. (Rejected): A method for objectively monitoring a noise level as set forth in claim 2 including the step of preparing at least one report as part of the step of generating feedback, said report providing information relating to repair information.

7. (Rejected): A method for objectively monitoring the noise level as set forth in claim 1 including the steps of:

documenting any diagnosis and repair relating to the product;

determining the most common cause of noise in the product; and

providing possible suggestions to improve the product by reducing overall noise levels.

8. (Rejected): A method for objectively monitoring a noise level as set forth in claim 2 including the step of documenting, using a standardized list of descriptors, the cause of the noise and any necessary repairs to the product.

9. (Rejected): A method for objectively monitoring a noise level as set forth in claim 8 wherein the standardized list corresponds to known warranty code parameters.

10. (Rejected): A method for objectively monitoring the sound level of vibration induced sounds on a vehicle comprising the steps of:

placing a sound recording instrument in a position with respect to the vehicle to record sound emitted from the vehicle;

connecting the sound recording instrument to a data acquisition apparatus;

vibrating the vehicle and using the data acquisition apparatus to record the vibration induced sound;

measuring the level of the vibration induced sound and computing an objective metric; and

comparing the objective metric with a threshold metric.

11. (Rejected): A method for objectively monitoring the level of vibration induced sound on a vehicle as set forth in claim 10 wherein the objective metric and the threshold metric are based on a N10 loudness scale.

12. (Rejected): A method for objectively monitoring the level of vibration induced sound on a vehicle as set forth in claim 10 wherein said step of comparing the objective metric with a threshold metric includes the steps of:

evaluating the comparison of the objective metric with the threshold metric to determine whether the vibration induced sound level in the vehicle is unacceptable;

when the evaluation indicates that the sound level is unacceptable, diagnosing the vehicle to determine the source of the unacceptable sound level;

performing an appropriate repair; and

confirming that the unacceptable sound level is no longer present.

13. (Rejected): A method for objectively monitoring the level of vibration induced sound on a vehicle as set forth in claim 12 including the step of documenting the diagnosis and repair.

14. (Objected to): A method for objectively monitoring the level of vibration induced sound on a vehicle as set forth in claim 12 including the step of using a graphical user interface and standardized list of descriptors to input into the data acquisition apparatus information pertaining to the diagnosis and repair.

15. (Rejected): A method for objectively monitoring the level of vibration induced sounds on a vehicle as set forth in claim 13 including the step of inputting into the data acquisition apparatus information pertaining to the diagnosis and repair.

16. (Rejected): A method of objectively monitoring the level out of vibration induced sound on a vehicle as set forth in claim 12 including the steps of:

saving data relating to each vehicle tested including, the objective metric, threshold metric, and any diagnosis and repair; and

performing a statistical analysis on the saved data.

17. (Rejected): A method for objectively monitoring the level of vibration induced sound on a vehicle as set forth in claim 12 including the steps of:

saving data relating to each vehicle tested including, the objective metric, threshold metric, and any diagnosis and repair;

performing statistical processing on the saved data;  
generating feedback based on the statistical processing;  
reviewing the feedback to determine repair information; and  
using said feedback to develop corrective action to reduce the level of vibration induced sound.

18. (Rejected): A method of objectively monitoring the sound level occurring in a vehicle during operation comprising the steps of:

placing a sound recording instrument within the vehicle;  
connecting sound recording instrument to a data acquisition apparatus;  
measuring and recording the sound level emitted from the vehicle during operation;  
computing an objective metric based on the recorded sound level;  
subjectively evaluating the vehicle to determine the source of the sound emitted from the vehicle when the objective metric exceeds a threshold metric;  
and  
if necessary, repairing the vehicle to reduce the sound to an acceptable level.

19. (Rejected): A method of objectively monitoring the sound level occurring in a vehicle during operation as set forth in claim 18 wherein the objective metric and the threshold metric are based on a N10 loudness scale.

20. (Rejected): A method of objectively monitoring the sound level occurring in a vehicle during operation as set forth in claim 18 including the steps of:

- documenting the evaluation and repair;
- saving data relating to each vehicle tested including, the recorded sound level, the objective metric, threshold metric, the evaluation and any repair;
- performing statistical processing on the saved data;
- generating feedback information based on the statistical processing; and
- using said feedback to develop corrective action to reduce the sound level in the vehicle.

**9. Evidence appendix**

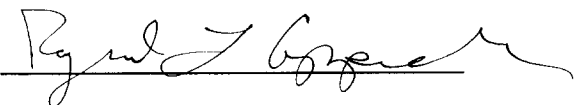
None

**10. Related proceedings appendix**

Copy of Notice of Panel Decision from Pre-Appeal Brief Review attached.

Respectfully submitted,

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Dated: October 18, 2006